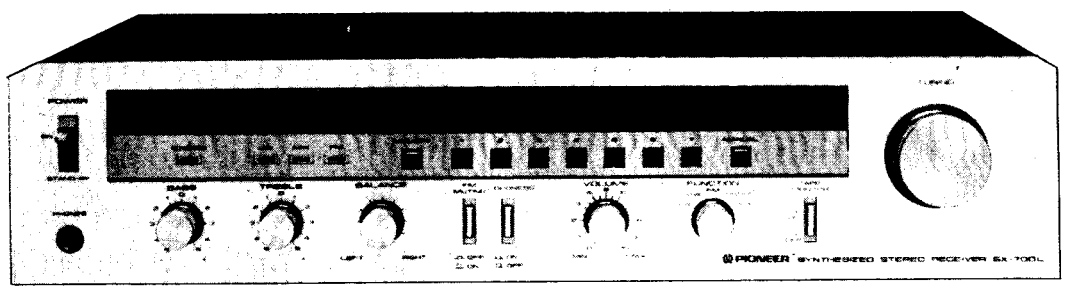
SYNTHESIZED
STEREO RECEIVER

SX-700L

SERVICE MANUAL



PIONEER®

MODEL SX-700L COMES IN TWO VERSIONS DISTINGUISHED AS FOLLOWS.

Type	Voltage	Remarks
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model

• **This service manual is applicable to the HE type. When repairing the HB type, please see page 26.**

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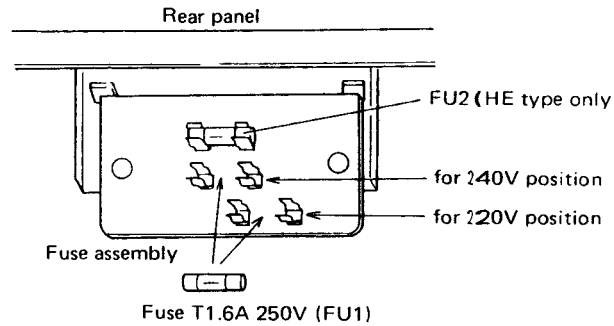
Line Voltage Selection

Line voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Take out the fuse from the fuse assembly.
4. Re-install the fuse in the correct voltage indication.
5. Stick the line voltage label on the rear panel.

Part No.	Desctiption
AAX-193	220V label
AAX-192	240V label



1. SPECIFICATIONS

Amplifier Section

Continuous power output of 40 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.2% total harmonic distortion.

Continuous Power Output at 1kHz (both channels driven)
T.H.D. 0.2%, 8 ohms ..... 45 watts per channel
Total Harmonic distortion (20 Hertz to 20,000 Hertz, 8 ohms, from AUX)
20 watts per channel power output
.... No more than 0.07%
Intermodulation Distortion (50 Hertz : 7,000 Hertz = 4 : 1, 8 ohms, from AUX)
continuous rated power output ... No more than 0.2%
20 watts per channel power output
.... No more than 0.07%
Damping Factor (1,000 Hertz, 8 ohms) 30
Input (Sensitivity/Impedance)
PHONO ..... 2.5mV/50 kilohms
AUX, TAPE PLAY ..... 150mV/50 kilohms
Phono Overload Lever (T.H.D. 0.1%, 1,000Hz) .. 150mV
Output (Level)
TAPE REC 150mV
Frequency Response
PHONO (RIAA Equalization)
..... 30Hz to 15,000 Hz±0.5dB
AUX, TAPE PLAY ..... 7Hz to 60,000Hz $^{+1}_{-3}$ dB
Tone Control
BASS ..... ±8dB (100Hz)
TREBLE ..... ±8dB (10kHz)
Loudness Contour (Volume control set at –40dB position)
..... +10dB (100Hz)
Hum and Noise (IHF, short-circuited, A network)
PHONO 70dB
AUX, TAPE PLAY 100dB
Hum and Noise (DIN, continuous power/50mW)
PHONO 67dB/62dB
AUX, TAPE PLAY 87dB/66dB

FM Tuner Section

Usable Sensitivity (IHF) ..... 12dBf (2.2 μV)
50dB Quieting Sensitivity
MONO 17.2dBf (4μV)
STEREO 37.2dBf (40μV)
Sensitivity (DIN)
MONO 2μV
STEREO 80μV
Signal-to-Noise Ratio
MONO ..... 78dB (at 60dBf)
STEREO ..... 72dB (at 75dBf)
Signal-to-Noise Ratio (DIN)
MONO ..... 75dB (at 60dBf)
STEREO ..... 60dB (at 75dBf)
Distortion (at 65dBf)
MONO 1kHz 0.5%
STEREO 1kHz 0.3%
Capture Ratio 2.5dB
Alternate Channel Selectivity (400kHz) 50dB
Stereo Separation
1kHz 45dB
Frequency Response ..... 30Hz to 15kHz±0.5dB
Spurious Response Ratio 70dB
Image Response Ratio 45dB
IF Response Ratio 90dB
AM Suppression Ratio 50dB
Antenna Input
..... 300 ohms balanced, 75 ohms unbalanced

MW Tuner Section

Sensitivity (IHF, ferrite antenna) 270μV/m
(IHF, ext. antenna) 10μV
Selectivity 25dB
Signal-to-Noise Ratio 52dB
Image Response Ratio 32dB
IF Response Ratio 40dB
Antenna ..... Ferrite loopstick antenna

LW Tuner Section

Sensitivity (IHF, ferrite antenna) 450μV/m
(IHF, ext. antenna) 20μV
Selectivity 25dB
Signal-to-Noise Ratio 52dB
Image Response Ratio 20dB
IF Response Ratio 30dB
Antenna ..... Ferrite loopstick antenna

Miscellaneous

Power Requirements HE model ... a.c. 220V, 50/60Hz
HB model ... a.c. 240V, 50/60Hz
Power Consumption 240W
Dimensions ..... 420(W) x 94(H) x 361 (D) mm
16-9/16(W) x 3-11/16(H) x 14-3/16(D) in
Weight (without package) ..... 7.1 kg (15 lb 11oz)

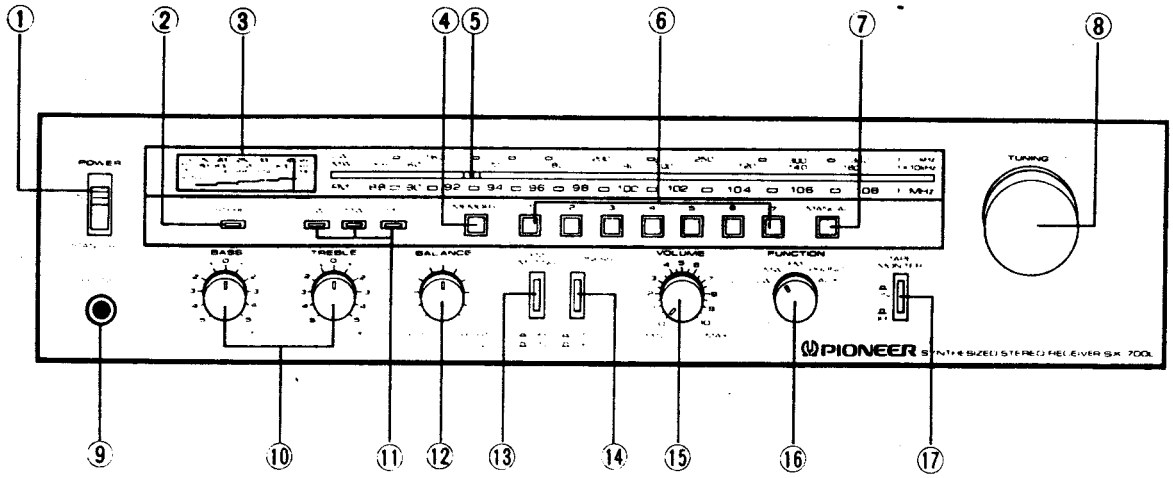
Furnished Parts

Operating instructions 1
FM T-type antenna 1

**Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

NOTE:
Specifications and the design subject to possible modifications without notice due to improvements.

2. FRONT PANEL FACILITIES



① POWER SWITCH

When this switch is set to ON position, power is supplied to the receiver's main circuits. The unit's power switch is geared to selecting the transformer's secondary and so even at STAND-BY position, the unit's circuitry will work as long as the power cord is connected to the power outlet. For this reason, the programmed broadcasting stations will not be erased.

Disconnect the power cord from the power outlet when you do not plan to use the unit for a long period of time. When it has been disconnected, the broadcasting stations remain programmed for about 3 days.

② FM STEREO INDICATOR

This indicator lights up when receiving an FM stereo program.

③ SIGNAL METER/PRESET FREQUENCY DISPLAY METER

This is a dual-purpose meter. During manual tuning it serves as a signal meter and with preset tuning it serves to indicate the frequencies of the broadcasting stations. With manual tuning, rotate the tuning knob, align the dial pointer near the frequency of the station you want to tune in, and adjust the tuning knob so that the signal meter pointer deflects as far to the right as possible.

With preset tuning, the pointer moves to the frequency of the preset station in line with the preset switch which has been depressed.

④ MEMORY SWITCH

This is depressed to preset a broadcasting station in a preset switch (memory operation). When presetting the frequency of a station in one of the preset switches, depress the preset switch with this switch in the depressed position.

⑤ DIAL POINTER

This pointer indicates the broadcasting stations.

⑥ PRESET SWITCHES

Depress these switches when calling out preset broadcasting stations and when presetting these stations. When one of the switches is depressed, it lights and it remains lighted during call-out.

One switch can be used to preset one FM station and one LW or MW station. To call out the preset station, first set the function selector to the frequency band and then depress the preset switches. The broadcasting station can be checked by the position of the pointer on the preset frequency display meter.

Depress one switch only to call out a station. If two or more switches are depressed simultaneously, the broadcasting station may not be called out.

⑦ MANUAL SWITCH

This switch is depressed when tuning in a station with the tuning knob. When it is depressed when changing from preset tuning to manual tuning, the preset switch light goes off and the dial pointer lights.

NOTE:

When one of the preset switches is depressed, it is not possible to tune in a station using the tuning knob. (When the dial pointer illumination goes off, it means that tuning is not possible with the tuning knob.)

⑧ TUNING KNOB

Use this knob to tune in to broadcasting stations.

⑨ HEADPHONE JACK

Plug your headphones into this jack when you want to listen to a program source in private.

NOTE:
When the headphones plug is connected to this jack, the sound will no longer be heard through the speakers.

⑩ BASS AND TREBLE CONTROLS

Use these controls to adjust the bass and the treble. If you turn the bass control to the right from its center position, you will be able to emphasize the sound in the low-frequency range. Conversely, turning this control left from the center position, you will attenuate the sound in the low-frequency range.
You can use the treble control to adjust the sound in the high-frequency range.

⑪ FUNCTION INDICATORS

The LW, MW or FM indicator lights in line with the position selected by the function selector.

⑫ BALANCE CONTROL

Use this control to balance the volume of the left and right channels. If the sound appears to be louder on the right, it means that the volume of the right channel is higher. Turn the balance control to the left and adjust.
Conversely, if the sound appears to be louder on the left, it means that the volume of the left channel is higher. Therefore, turn the balance control to the right and adjust.

⑬ FM MUTING SWITCH

When this switch is released and an FM broadcast tuned in, the muting circuit is activated inside to suppress the annoying interstation noise between the broadcasting frequencies for noise-free reception. When the broadcasting station is far away or when receiving a station in a fringe area, set the switch to the OFF position and then tune in. If there is a broadcasting station with a strong signal level on the air next to a station whose program you want to receive, you may not be able to tune in satisfactorily because the sound will be drowned out by the stronger signals. In cases like this, set the FM muting switch to OFF (depressed position) and tune in. The muting circuit does not work when the tuner is receiving AM (LW, MW) broadcasts.

⑭ LOUDNESS SWITCH

When listening to a performance with the volume control turned down, depress this switch and the bass will be accentuated.
When the volume is low, the human ear finds it harder to hear the bass than when the volume is high. The loudness switch is thus designed to compensate for this deficiency. By setting it to ON, the bass comes through much more strongly and the sound takes on a punch even when the volume control is turned down.

⑮ VOLUME CONTROL

Use this control to adjust the output level to the speakers and headphones. Turn it clockwise to increase the output level. No sound will be heard if you set it to "0".

⑯ FUNCTION SELECTOR

This is used to select the program source.
When selecting between the LW, MW or FM position, the sound will be cut off momentarily. This is in order to suppress the noise which is generated usually when the function selector is selected.

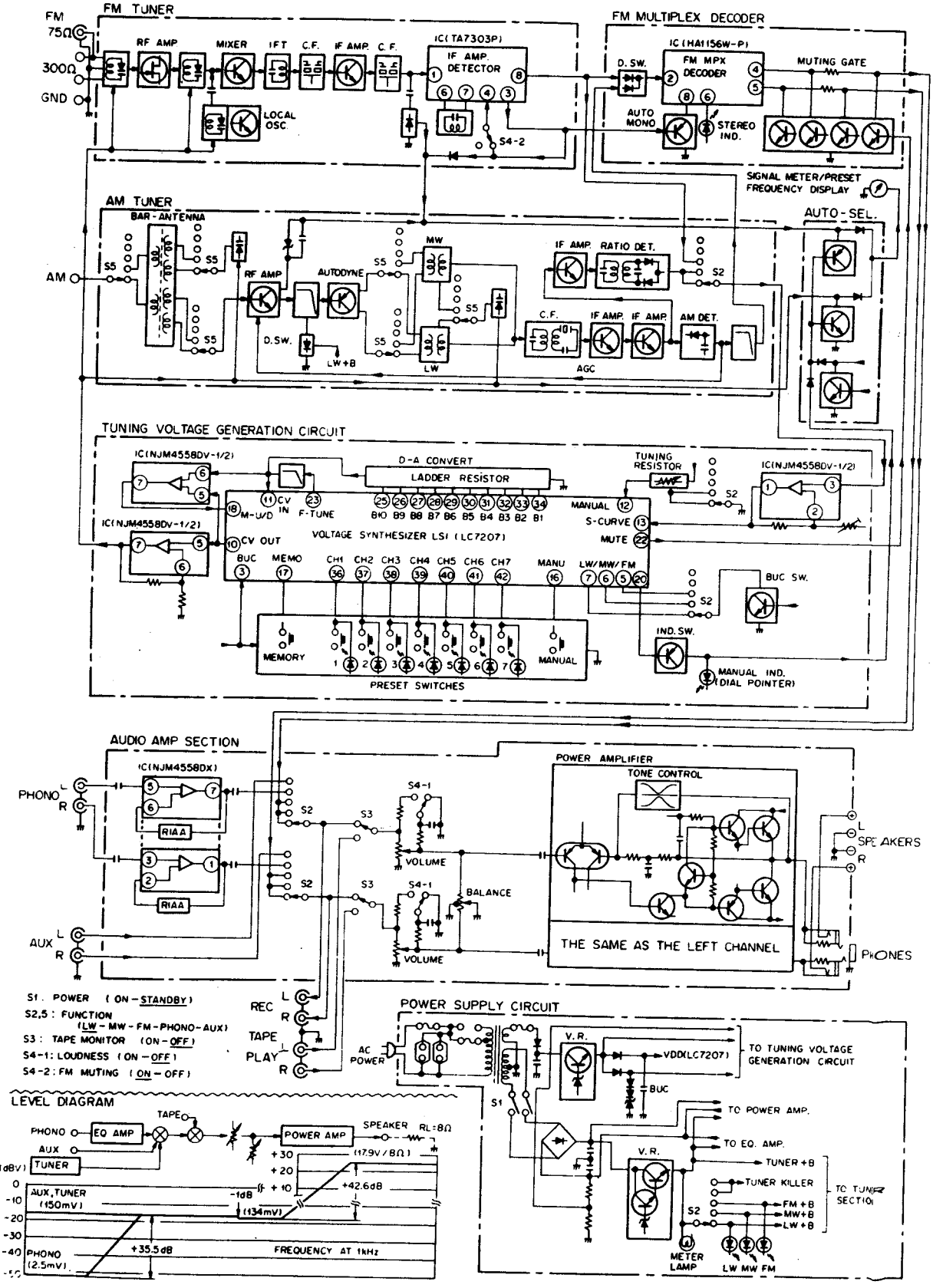
LW . . . . . Set here when receiving an LW broadcast.
MW . . . . . Set here when receiving an MW broadcast.
FM . . . . . Set here when receiving an FM braodcast.
PHONO. . . Set here when playing records on a turntable connected to the PHONO jacks.
AUX . . . . Set here when listening to a program source which is connected to the AUX jacks.

⑰ TAPE MONITOR SWITCH

Depress this switch when monitoring a tape performance on a tape deck which you have connected to the TAPE jacks or when monitoring a recording.

NOTE:
Set the switch to the OFF position when listening to records or broadcasts, etc. selected by the function selector.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 TUNER CIRCUIT

The tuner section of the SX-700L features an electronic tuning system where the conventional tuning capacitor has been replaced by variable capacitance diodes (vari-caps). In addition to manual tuning, it is also possible to preset 7 FM stations and 7 AM stations (including MW and LW stations).

FM Tuner

The front-end consists of a J-FET RF amplifier (single stage), and also includes 3 vari-caps in a tuning circuit corresponding to a 3-ganged tuning capacitor. DC voltages generated in the tuning voltage generator circuit are applied to these vari-caps, and are modified by the variable resistor coupled to the TUNING knob during manual tuning. During preset tuning, the required DC voltage level is read out from the voltage synthesizer LSI (LC7207).

The IF stage consists of 2 dual-element ceramic filters, a single-transistor IF amplifier, and an IC (TA7303P). This stage is used in the amplification and detection of the IF signal.

The stereo decoder stage incorporates the PLL MPX IC (HA1156W-P).

AM Tuner

The AM tuner consists of 4 transistors, and includes 2 vari-caps in a tuning circuit corresponding to a 2-ganged tuning capacitor to cope with the 2 bands (LW: 150kHz — 350kHz, and MW: 525kHz — 1605kHz).

4.2 ELECTRONIC TUNING SYSTEM

The LSI (LC7207) incorporated in the SX-700L electronic tuning system outlined in Fig. 4-1 is a special 42-pin DIP package C-MOS LSI developed expressly for use in the LW/MW/FM tuner voltage synthesizer electronic tuning system.

The major terminal functions are summarized below.

- CR1 (pin 1)

The oscillator circuit used to determine the fundamental clock pulse for the system is formed by connecting an RC time constant circuit to this pin.

- CR2 (pin 2)

The timer circuit is formed by connecting another RC time constant circuit to pin 2. This circuit is then used in determining the pulse width of the MUTE output signal employed during band switching.

- $\overline{\text{BUC}}$ (pin 3)

This is the LSI memory backup control terminal. All functions apart from memory hold are inhibited when a low level input signal is applied.

- $\overline{\text{FM}}$ (pin 5)

The SX-700L is switched to FM reception mode when a low level input signal is applied to this terminal. This FM mode is maintained even if the terminal is subsequently switched to high level (low level hold time: 5ms. minimum).

- $\overline{\text{MW}}$ (pin 6)

Likewise, the SX-700L is switched to AM-MW reception mode when a low level signal is applied to pin 6. This reception mode is maintained even if the terminal is subsequently switched to high level (low level hold time: 5ms. minimum).

- $\overline{\text{LW}}$ (pin 7)

Furthermore, switching to the AM-LW reception mode is achieved by applying a low level signal to pin 7, and is maintained even if the terminal is subsequently switched to high level (low level hold time: 5ms. minimum).

- CV out (pin 10)

An analog switch output terminal where the tuning voltage output signal appears.

- CV in (pin 11)

An analog switch input terminal to which the R-2R ladder output voltage is applied.

- Manu Tune (pin 12)

An analog switch input terminal to which the tuning voltage modified by the manual tuning variable resistor is applied.

- S-Curve (pin 13)

The AFC (Automatic Frequency Control) control signal input to which the FM and AM S-curve voltages are applied. (This S-curve describes the variation in DC level for the FM detector while tuning to and away from a particular station).

- $\overline{\text{MANU}}$ (pin 16)

The SX-700L is switched to manual tuning mode when a low level input signal is applied to this terminal, but switched back to preset tuning mode if any one of the $\overline{\text{CH1}}$ to $\overline{\text{CH7}}$ terminals is switched to low level.

- $\overline{\text{MEMO}}$ (pin 17)

This terminal is switched to memory enable

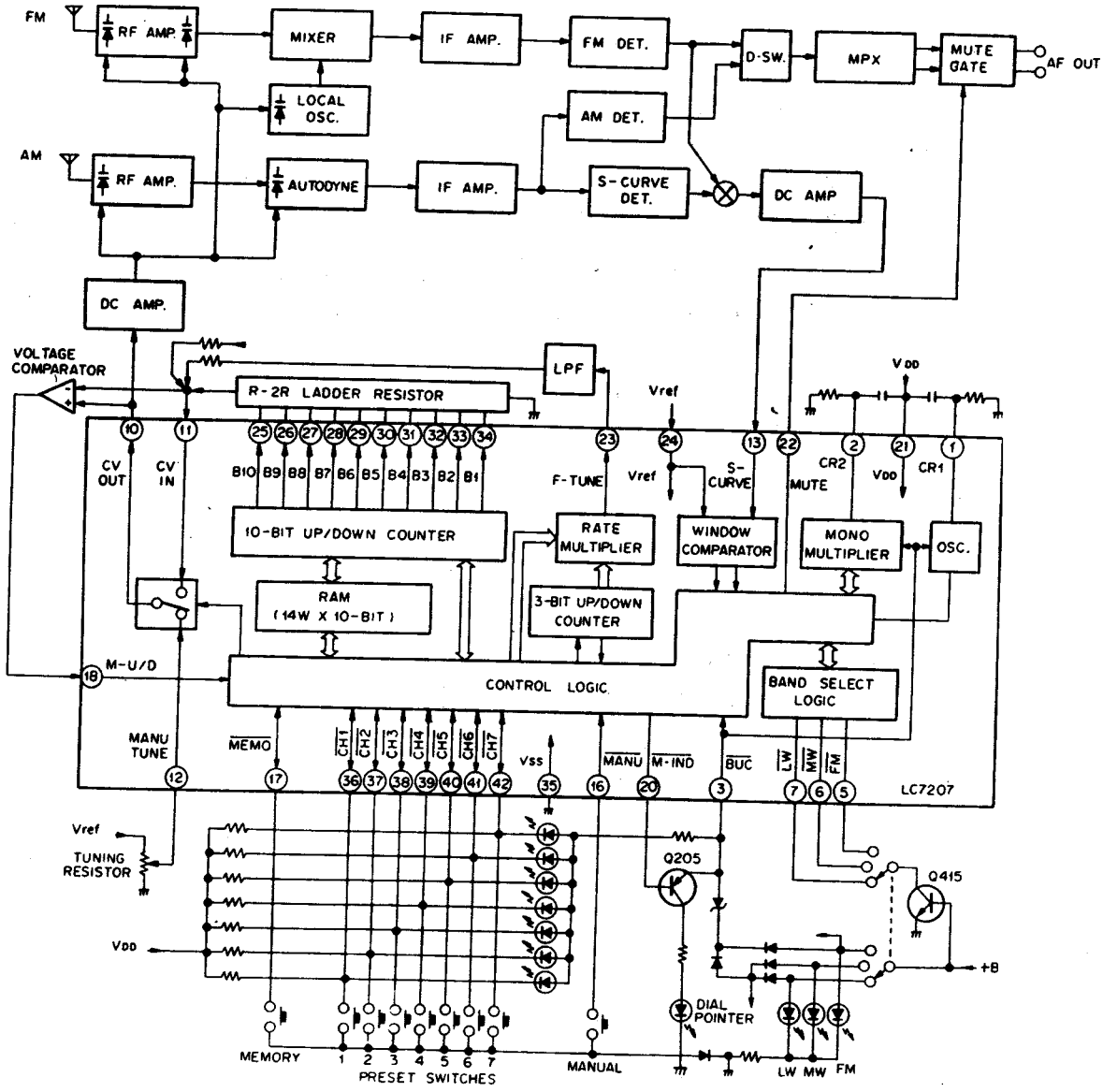


Fig. 4-1 Electronic Tuning System

mode while the input signal is maintained at low level.

- **M-U/D (pin 18)**

10-bit data is counted up when a high level input signal is applied, resulting in an increase in the ladder output voltage. When a low level signal is applied, the 10-bit data is counted down, and the ladder output voltage consequently decreased.

- **$\overline{\text{M-IND}}$ (pin 20)**

This output terminal is switched to low level during manual tuning mode, resulting in the appearance of an indicator output signal.

- **VDD (pin 21)**

The LSI power supply terminal.

- **MUTE (pin 22)**

This is the muting control signal output terminal where a high level output signal appears during preset tuning and band switching operations.

- **F-Tune (pin 23)**

An 8-step PWM (Pulse Width Modulation) output signal is generated at this terminal during fine tuning operations (while a T = 1.5ms duty ratio 50% signal is generated at all other times), and passed via an external low-pass filter to supply the compensatory voltage for fine tuning purposes.

- **Vref (pin 24)**

Reference voltage.

- **B10 — B1 (pin 25 — pin 34)**

The 10-bit up/down counter output terminals

connected to the R-2R ladder resistor for D-A (digital-analog) conversion.

- VSS (pin 35)
  The LSI ground terminal.
- $\overline{CH1}$ — $\overline{CH7}$ (pin 36 — pin 42)
  Broadcasting frequencies already stored in the memory are selected when the corresponding $\overline{CH}$ terminal is switched to low level. If the $\overline{MEMO}$ terminal is also switched to low level while one of the $\overline{CH}$ terminals is switched to low level, the presently tuned broadcasting frequency will be stored in that channel (low level hold time: 20ms. minimum).

NOTE:
The automatic search tuning function incorporated in the LC7207 LSI is not used in the SX-700L. Furthermore, description of functions of non-used terminals has been deleted.

Band Switching (LW/MW/FM)

FUNCTION switch operation results in one of the band designator terminals pin 5 ($\overline{FM}$), pin 6 ($\overline{MW}$), or pin 7 ($\overline{LW}$) being connected to ground (i.e. switched to low level), thereby switching the SX-700L to the selected band. Although Q415 remains on during normal operation, it is turned off when the POWER switch is set to STAND BY, or when the AC line power supply is cut. So current is stopped during memory hold mode, thereby reducing the power consumption level.

Manual Tuning

The SX-700L is switched to manual tuning mode when pin 16 ($\overline{MANU}$) is switched to low level by turning the MANUAL switch on.

When the TUNING knob is turned, the variable resistor coupled to the TUNING knob is activated, resulting in a change in the DC voltage applied to pin 12 (Manu Tune). This input voltage is passed via an analog switch incorporated inside the LSI, and appears again at pin 10 (CV out) as an output signal which is subsequently applied to a DC amplifier and the tuning circuit vari-caps in order to change the tuning frequency. During manual tuning mode, pin 20 ($\overline{M\text{-}IND}$) is switched to low level, resulting in Q205 being turned on to light up the dial pointer LED.

Preset Tuning

When the MEMORY switch and PRESET switch are both turned on together, the presently tuned broadcasting frequency will be stored in the SX-700L memory. And when the PRESET switch only is turned on, a broadcasting frequency already stored in the memory will be selected (i.e. tuned automatically). The SX-700L has been designed to store up to 7 FM frequencies and 7 AM frequencies (including both MW and LW broadcasting frequencies).

- Preset Memory
  The preset memory for manually tuned stations involves A-D conversion (to a 10-bit digital code), and the storage of an approximate value in the LSI (obtaining a resolution of approx. 1/4000 when the fine tuning function described later is included).

Digital encoding of the tuning voltage is achieved in the following way. The LSI 10-bit up/down counter code output obtained from pin 25 to pin 34 (B10 — B1) is D-A converted (digital code converted into analog quantity) by the R-2R ladder resistor, and then compared with the tuning voltage (during manual tuning mode) by a voltage comparator, the result being applied to pin 18 (M-U/D).

If the ladder resistor output voltage is lower than the tuning voltage (manual tuning), the pin 18 input is switched to high level, resulting in the LSI 10-bit up/down counter counting up and the ladder resistor output voltage being increased. If the ladder resistor output voltage is higher than the tuning voltage, a low level input is applied to pin 18, resulting in the 10-bit up/down counter counting down, and the ladder resistor output voltage being decreased. In this way, the up/down counter 10-bit code is immediately approximated to the tuning voltage (manual tuning), and then subjected to A-D conversion.

When the MEMORY and PRESET switches are turned on together, the up/down counter 10-bit code is stored in the LSI RAM (Random Access Memory), thereby storing the tuning voltage corresponding to the presently tuned broadcasting frequency.

- Direct Tuning by Memory Read-Out
  When any one of the PRESET switches (1 to 7) is turned on, the designated memory 10-bit data is read out from the LSI RAM by the up/down counter, and the resultant output thus appears at pin 25 to pin 34. These outputs are then D-A converted by the ladder resistor, and applied to pin 11 (CV in). After being passed through an LSI analog switch, the pin 11 input appears again at pin 10 (CV out), and is then applied to a DC amplifier and tuning circuit vari-caps. In addition, in order to compensate the point of optimum tuning, the AFC (Automatic Frequency Control) circuit is activated by applying the S-curve voltage to pin 13 (S-Curve). (This S-Curve represents the variation in DC level in the FM detector while

tuning to and away from a particular frequency). Since the AM tuner cannot obtain an S-curve voltage from the detector, a separate FM ratio detector is employed to provide the S-curve voltage.

- **Fine Tuning**

This function involves fine tuning adjustment apart from the AFC 10-bit data compensation. The output from pin 23 (F-Tune) is obtained as a 8-step pulse width modulation signal corresponding to the pin 13 input. This signal is then integrated and added to the ladder resistor output voltage for fine tuning purposes. Note that the AFC circuit is not activated during manual tuning mode.

- **Fetch Mode**

This function is used to re-align the center of the S-curve with the preset voltage by "swinging" the voltage when the preset voltage is displaced from the S-curve AFC range as a result of tuner drift. This voltage swing is gradually increased in both directions up to a maximum of ±8 steps (approx. ±56mV) to retrieve the S-curve. If the S-curve is not retrieved by this measure, the voltage is returned to the original preset voltage.

- **Memory Hold**

When pin 3 ($\overline{\text{BUC}}$) of the LSI is switched to low level, all functions except internal memory hold are inhibited. The memory is held by a very small current (approx. 50μA) in this case. Since the POWER switch in the SX-700L is connected to the secondary side of the power transformer, the LSI is still supplied with power with the POWER switch in the STAND BY position. In this case, pin 3 is switched to low level, resulting in the memory contents being preserved by a very small current. Furthermore, if the AC power mains is cut off altogether, the memories will be preserved for about 3 days by charge stored in a capacitor in the LSI power supply circuit.

Muting Control

The muting output signal obtained from pin 22 (MUTE) is used in eliminating unwanted noise generated during band switching and preset tuning operations. The SX-700L employs a ground-connected muting gate transistor connected to the tuner section output circuit to mute out these unwanted noises.

NOTE:
The muting circuit employed in muting the inter-station noise during FM tuning is incorporated in the TA7303 IC, and is turned on and off by the FM MUTING switch.

Preset Frequency Display Meter

Since the tuning frequencies selected during preset tuning mode are set irrespective of the tuning dial position, an independent method is used in the SX-700L to show the frequency of the selected preset frequency. Since the tuning voltage is used to determine the tuning frequency, it may also be used to drive the signal strength meter, the reading in this case indicating the tuned frequency. By incorporating an automatic selection circuit in this meter, the meter will operate as a signal strength meter during manual tuning, and as the preset frequency display meter during preset tuning mode.

- **Automatic Meter Selection Circuit**

The operating principle of this circuit is outlined in Fig. 4-2. During manual tuning, pin 20 ($\overline{\text{M-IND}}$) is switched to low level, resulting in Q205 being turned on. The Q205 collector voltage is consequently increased, resulting in the base voltage for Q412 and Q413 being switched to high level via D426. Q413 will be turned off since it is a PNP transistor, while Q412, an NPN transistor will be turned on. The tuning voltage is thereby blocked, and the meter thus employed as a signal strength meter.

During preset tuning mode, Q205 is turned off, resulting in a drop in the collector voltage. D426 will thus become non-conductive, resulting in the base voltage for Q412 and Q413 being switched to low level. Q412 will thus be turned off and Q413 turned on, resulting in the meter operating as the preset frequency display meter.

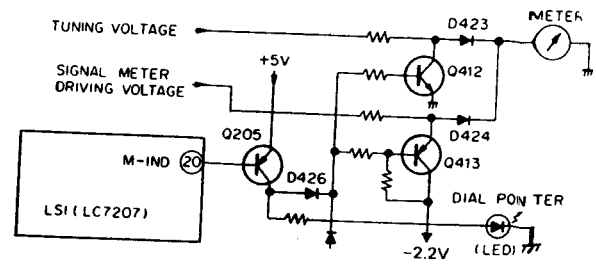


Fig. 4-2 Automatic Meter Selection Circuit

4.3 AUDIO AMPLIFIER SECTION

The EQ amplifier is an NFB type with one IC (NJM4558DX) in both L and R channels.

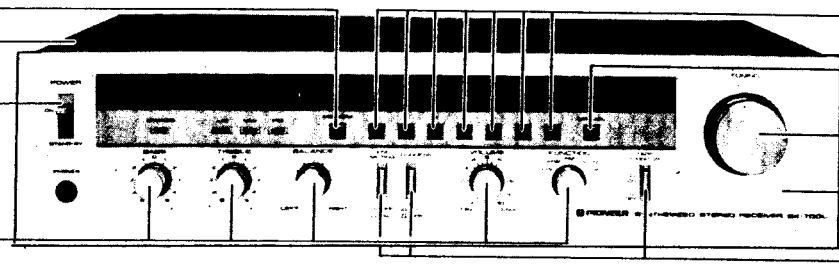
The power amplifier is quasi-complementary SEPP circuit features a differential amplifier in the first stage, in corporates the tone control circuits in the NFB loop.

5. PARTS LOCATION

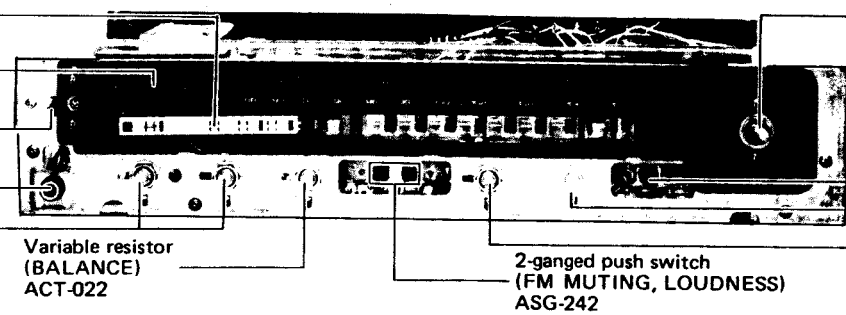
NOTE:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

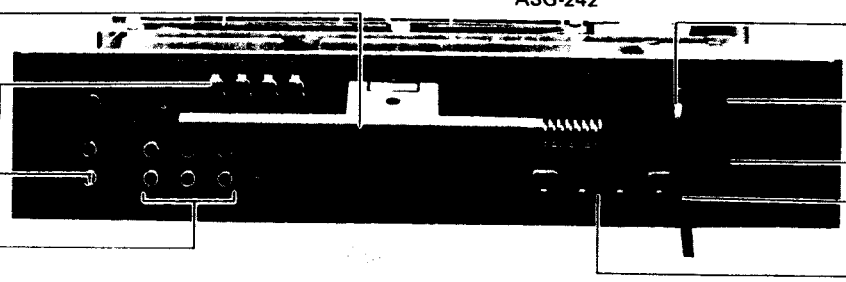
Front Panel View



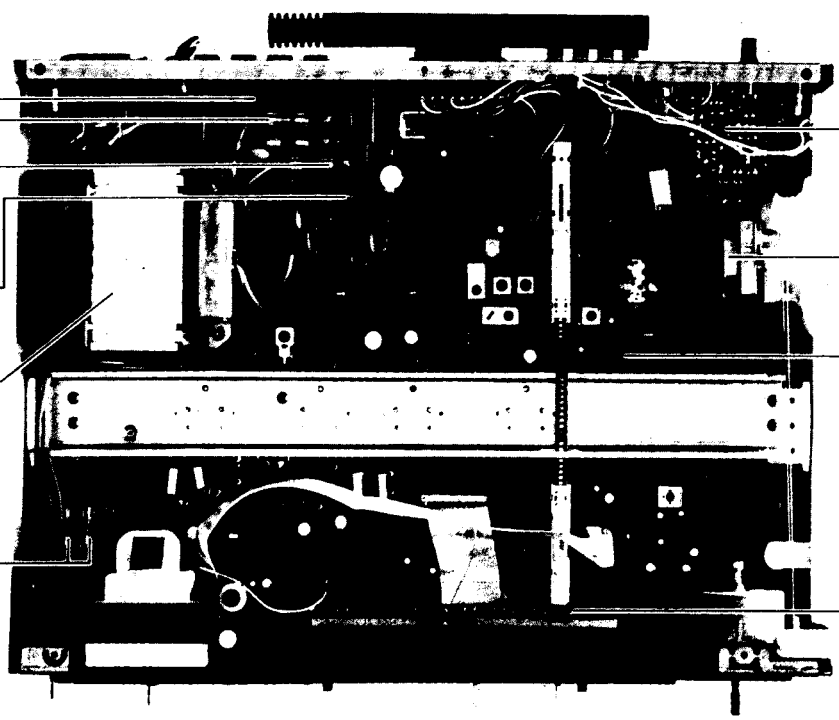
Front View with Panel Removed



Rear Panel View

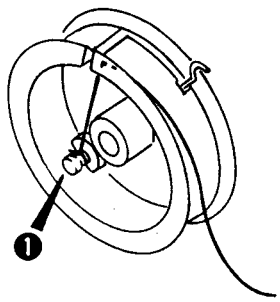


Top View

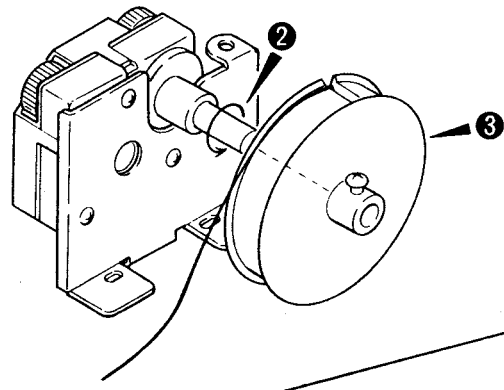


6. DIAL CORD STRINGING

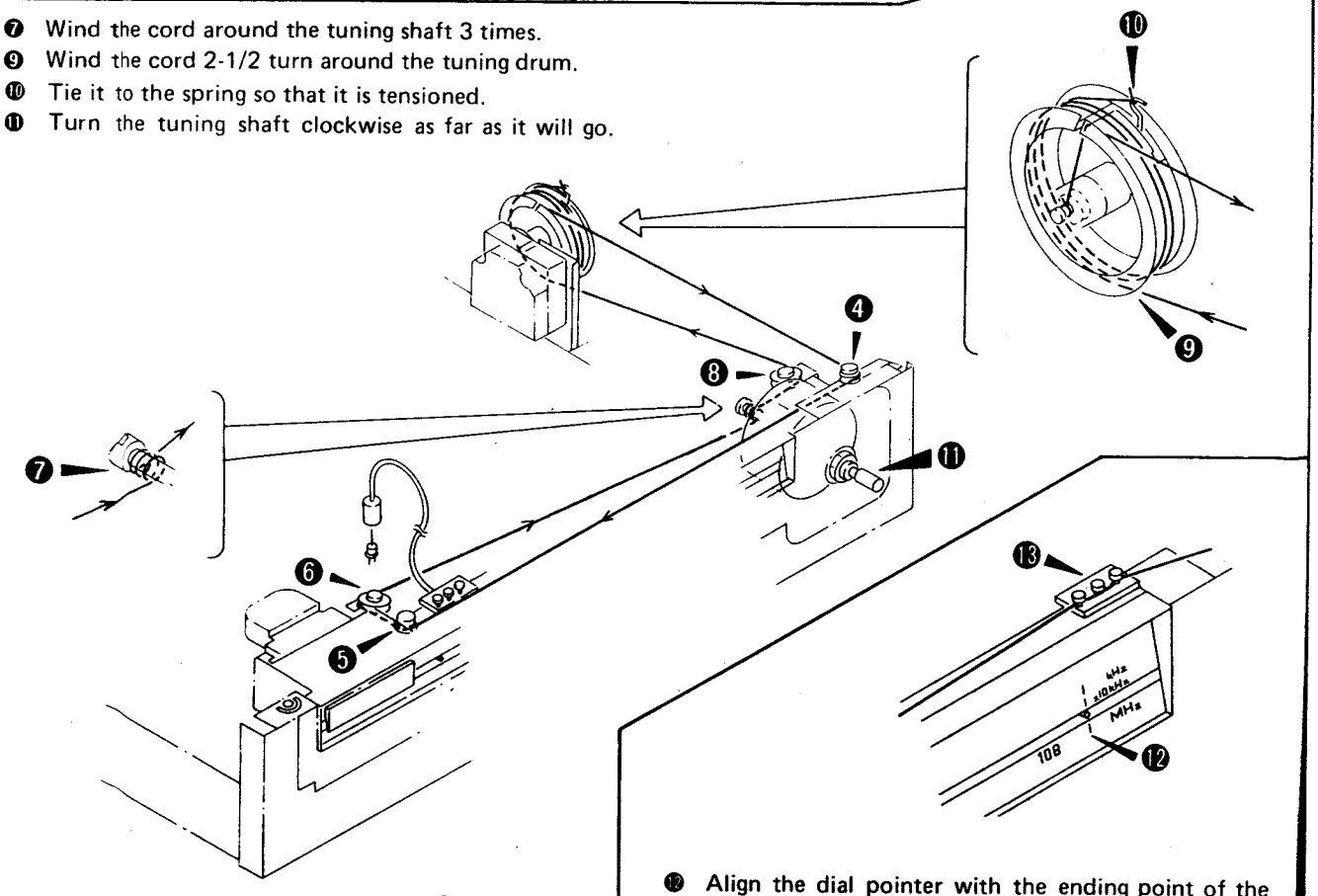
❶ Tie one end of the dial cord.



❷ Turn the tuning resistor shaft fulley counter-clockwise. ❸ Fix the tuning drum to the tuning resistor shaft so that the set-screw is uppermost.



❼ Wind the cord around the tuning shaft 3 times.
❾ Wind the cord 2-1/2 turn around the tuning drum.
❿ Tie it to the spring so that it is tensioned.
⓫ Turn the tuning shaft clockwise as far as it will go.



⓬ Align the dial pointer with the ending point of the dial scale. ⓭ Pass the cord over it.

Finally apply the locking paint to the knot of the cord and the dial pointer connection.

7. ADJUSTMENTS

7.1 TUNER SECTION

Tuning Voltage

- Set the FUNCTION selector to the MW position, the MANUAL switch to the ON position.
- Turn the TUNING knob counter-clockwise as far as it will go.

Step	FUNCTION	Adjustment point	Adjustment method
1	MW (no input)	VR201-b	Obtain a reading of DC1.5V (within ±50mV) between terminal no. 42 and ground.
2	FM (no input)	VR201-c	Obtain a reading of DC6V (within ±50mV) between terminal no. 42 and ground.

FM Tuner

- Connect the FM SG (FM signal generator) to the FM ANTENNA 300Ω terminal via a 300Ω dummy antenna.
- Set the FUNCTION selector to the FM position, FM MUTING switch to the OFF position.

Step	FM SG (400Hz, ±75kHz DEV.) Frequency	FM SG (400Hz, ±75kHz DEV.) Level	Position of dial pointer	Adjustment point	Adjustment method
1	106MHz	106dB	106MHz	CT403	Obtain maximum deflection of the signal meter.
2				T402	
3	106MHz	20dB	106MHz	CT403	Obtain maximum demodulated output (at TAPE REC terminal).
4				CT401	
5				CT402	
6				T401	
7	90MHz	20dB	90MHz	L403	
8				L401	
9				L402	
10	Repeat steps 3 to 9 until the maximum sensitivity.				
11	98MHz (Fin tune to SX-700L)	20dB / 66dB	98MHz	T402	Obtain minimum distortion in the demodulated output (TAPE REC terminal).
12	No signal		98MHz	VR203	Obtain a reading of DC4.75V (within ±50mV)between terminal no. 9 and ground.

FM Multiplex Decoder Circuit

- Connect the MPX SG (FM multiplex signal generator) to the FM SG external modulator terminal.
- Set the FM SG output to 98MHz and 66dB (modulation mode to external), and tune the SX-700L to this position.

Step	FM MPX SG	Adjustment point	Adjustment method
1	No signal (unmodulated)	VR401	Obtain a 19kHz (within ±50Hz) signal at terminal no.6.
2	Main: 1kHz, L+R, ±67.5kHz DEV. Pilot: 19kHz, ±7.5kHz DEV.	T401 (by up to 90° in either direction)	Reduce distortion in the output (TAPE REC terminal) to a minimum.

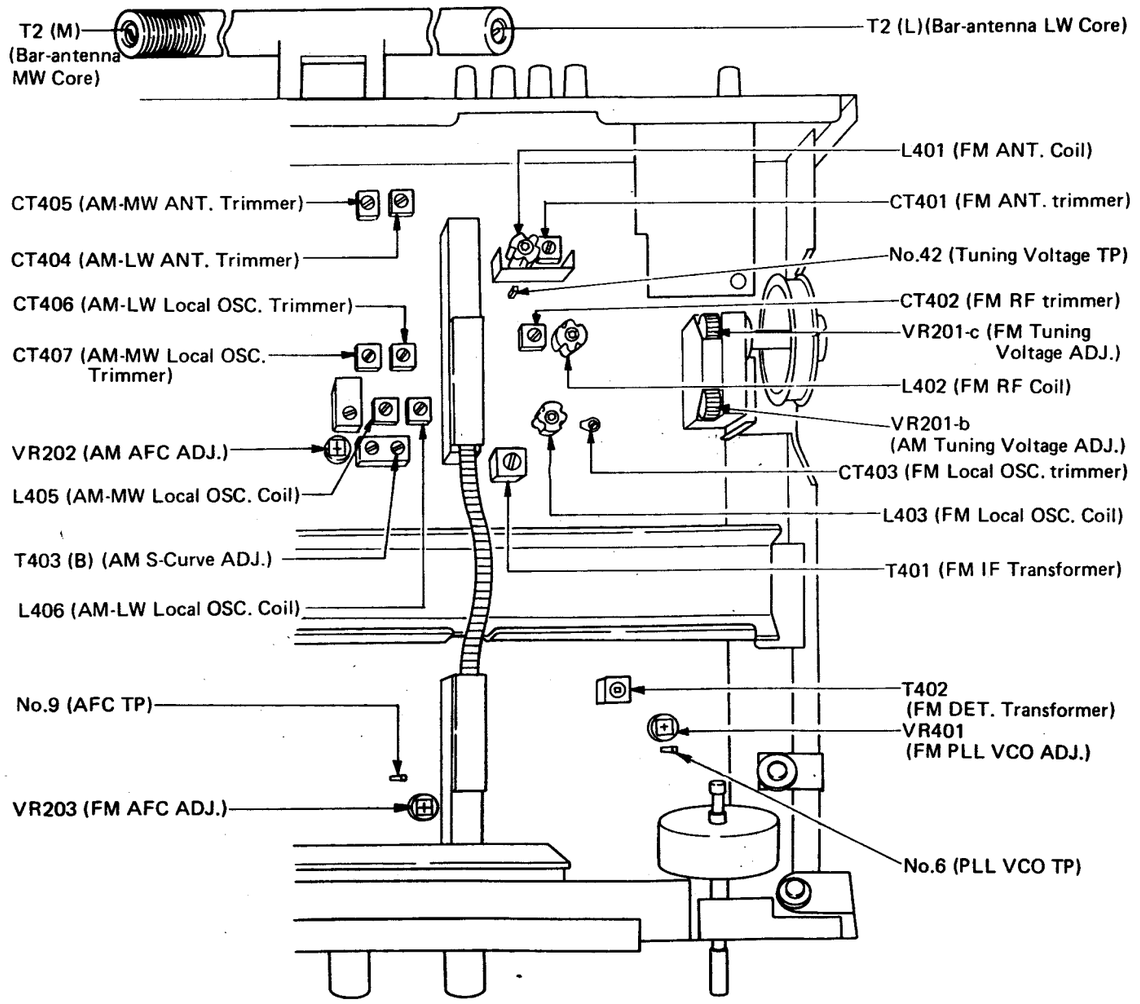

T2 (M) (Bar-antenna MW Core)
T2 (L)(Bar-antenna LW Core)
L401 (FM ANT. Coil)
CT405 (AM-MW ANT. Trimmer)
CT401 (FM ANT. trimmer)
CT404 (AM-LW ANT. Trimmer)
No.42 (Tuning Voltage TP)
CT406 (AM-LW Local OSC. Trimmer)
CT402 (FM RF trimmer)
CT407 (AM-MW Local OSC. Trimmer)
VR201-c (FM Tuning Voltage ADJ.)
L402 (FM RF Coil)
VR202 (AM AFC ADJ.)
VR201-b (AM Tuning Voltage ADJ.)
L405 (AM-MW Local OSC. Coil)
CT403 (FM Local OSC. trimmer)
L403 (FM Local OSC. Coil)
T403 (B) (AM S-Curve ADJ.)
T401 (FM IF Transformer)
L406 (AM-LW Local OSC. Coil)
T402 (FM DET. Transformer)
No.9 (AFC TP)
VR401 (FM PLL VCO ADJ.)
VR203 (FM AFC ADJ.)
No.6 (PLL VCO TP)

Fig. 7-1 Tuner Adjustment

FM Multiplex Decoder Circuit

- Connect the MPX SG (FM multiplex signal generator) to the FM SG external modulator terminal.
- Set the FM SG output to 98MHz and 66dB (modulation mode to external), and tune the SX-700L to this position.

Step	FM MPX SG	Adjustment point	Adjustment method
1	No signal (unmodulated)	VR401	Obtain a 19kHz (within ±50Hz) signal at terminal no.6.
2	Main: 1kHz, L+R, ±67.5kHz DEV. Pilot: 19kHz, ±7.5kHz DEV.	T401 (by up to 90° in either direction)	Reduce distortion in the output (TAPE REC terminal) to a minimum.

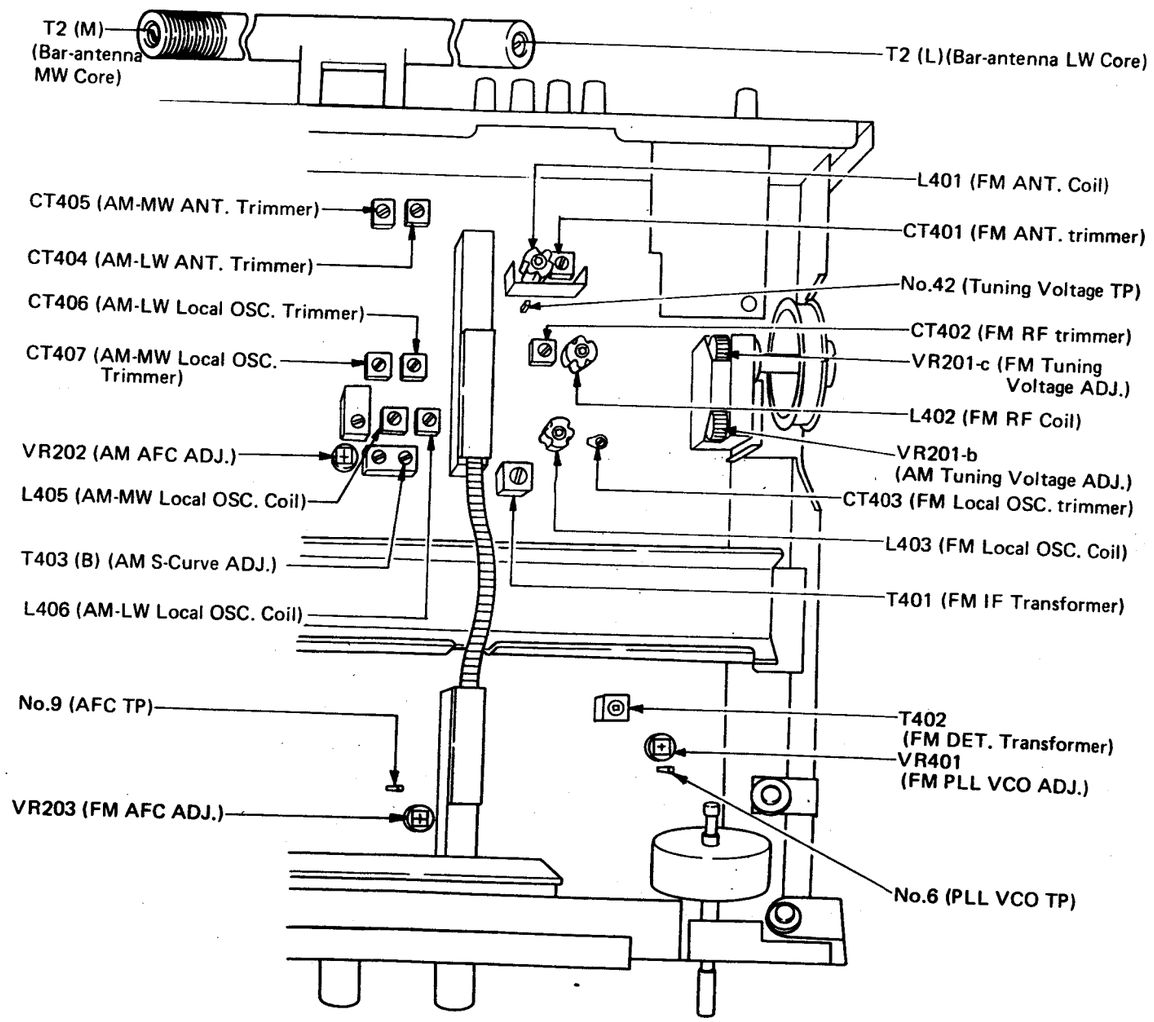

T2 (M)
(Bar-antenna MW Core)
T2 (L)(Bar-antenna LW Core)
L401 (FM ANT. Coil)
CT405 (AM-MW ANT. Trimmer)
CT401 (FM ANT. trimmer)
CT404 (AM-LW ANT. Trimmer)
No.42 (Tuning Voltage TP)
CT406 (AM-LW Local OSC. Trimmer)
CT402 (FM RF trimmer)
CT407 (AM-MW Local OSC. Trimmer)
VR201-c (FM Tuning Voltage ADJ.)
L402 (FM RF Coil)
VR202 (AM AFC ADJ.)
VR201-b (AM Tuning Voltage ADJ.)
L405 (AM-MW Local OSC. Coil)
CT403 (FM Local OSC. trimmer)
L403 (FM Local OSC. Coil)
T403 (B) (AM S-Curve ADJ.)
T401 (FM IF Transformer)
L406 (AM-LW Local OSC. Coil)
No.9 (AFC TP)
T402 (FM DET. Transformer)
VR401 (FM PLL VCO ADJ.)
VR203 (FM AFC ADJ.)
No.6 (PLL VCO TP)

Fig. 7-1 Tuner Adjustment

AM Tuner LW Band

- Connect the AM SG (AM signal generator) to the AM ANTENNA terminal via 1kΩ resistor.
- Set the FUNCTION selector to the LW position, the MANUAL switch to the ON position.

Step	AM SG (400Hz, 30% MOD.) Frequency	AM SG (400Hz, 30% MOD.) Level	Position of dial pointer	Adjustment point	Adjustment method
1	150kHz	40dB	150kHz	L406	Obtain maximum demodulated output (at TAPE REC terminal)
2				T2 (L)*	
3	350kHz	40dB	350kHz	CT406	
4				CT404	
5	Repeat steps 1 to 4 until the maximum sensitivity.				
6	No signal		250kHz	VR202	Obtain a reading of DC4.75V (within ±50mV) between terminal no. 9 and ground.
7	250kHz (Fine tune to SX-700L)	40dB	250kHz	T403(B)	

*Bar-antenna LW core

AM Tuner MW Band

- Connect the AM SG (AM signal generator) to the AM ANTENNA terminal via 1kΩ resistor.
- Set the FUNCTION selector to the MW position, the MANUAL switch to the ON position.

Step	AM SG (400Hz, 30% MOD.) Frequency	AM SG (400Hz, 30% MOD.) Level	Position of dial pointer	Adjustment point	Adjustment method
1	600kHz	40dB	600kHz	L405	Obtain maximum demodulated output (at TAPE REC terminal).
2				T2(M)*	
3	1400kHz	40dB	1400kHz	CT407	
4				CT405	
5	Repeat steps 1 to 4 until the maximum sensitivity.				

*Bar-antenna MW core

7.2 POWER AMPLIFIER

- Without any load or input signal, turn the VOLUME control to minimum position.
- Check that the voltage between terminals no. 16 and no. 15 (L ch.) lies within 2.5mV − 120mV range. Then make a similar check for the R ch. (between no. 17 and no. 18).
- If the voltage is less then 2.5mV, cut Jumper A (L ch.), and Jumper B (R ch.).
- If the voltage exceed 120mV, check for circuit failure.

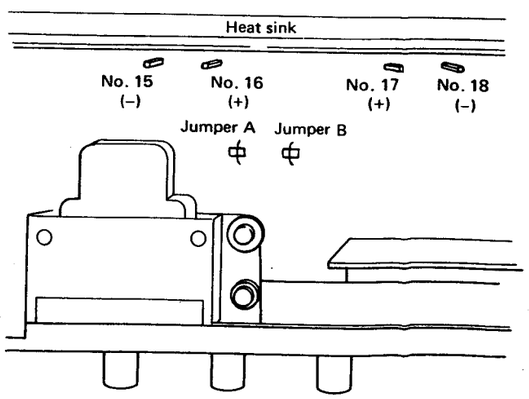
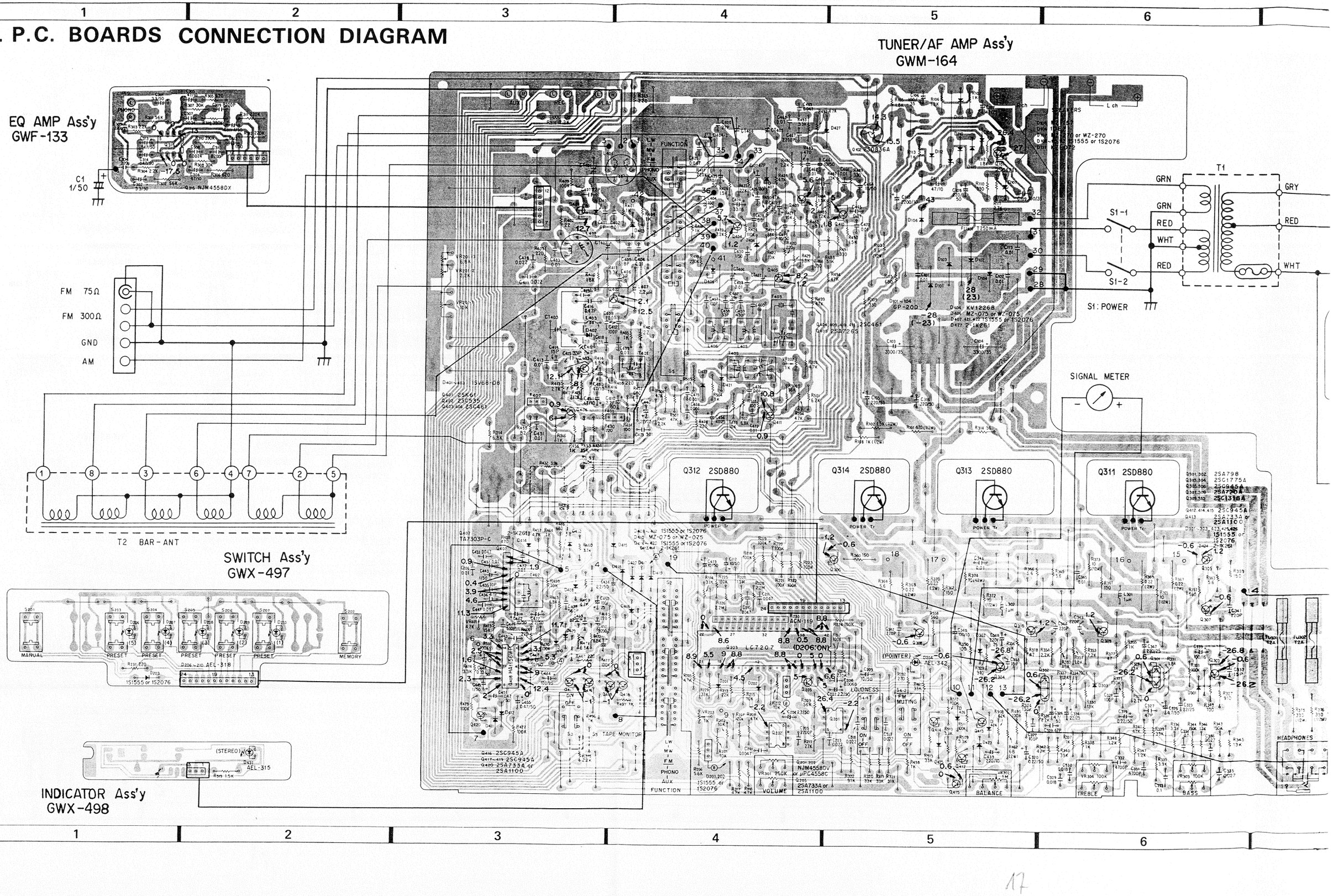
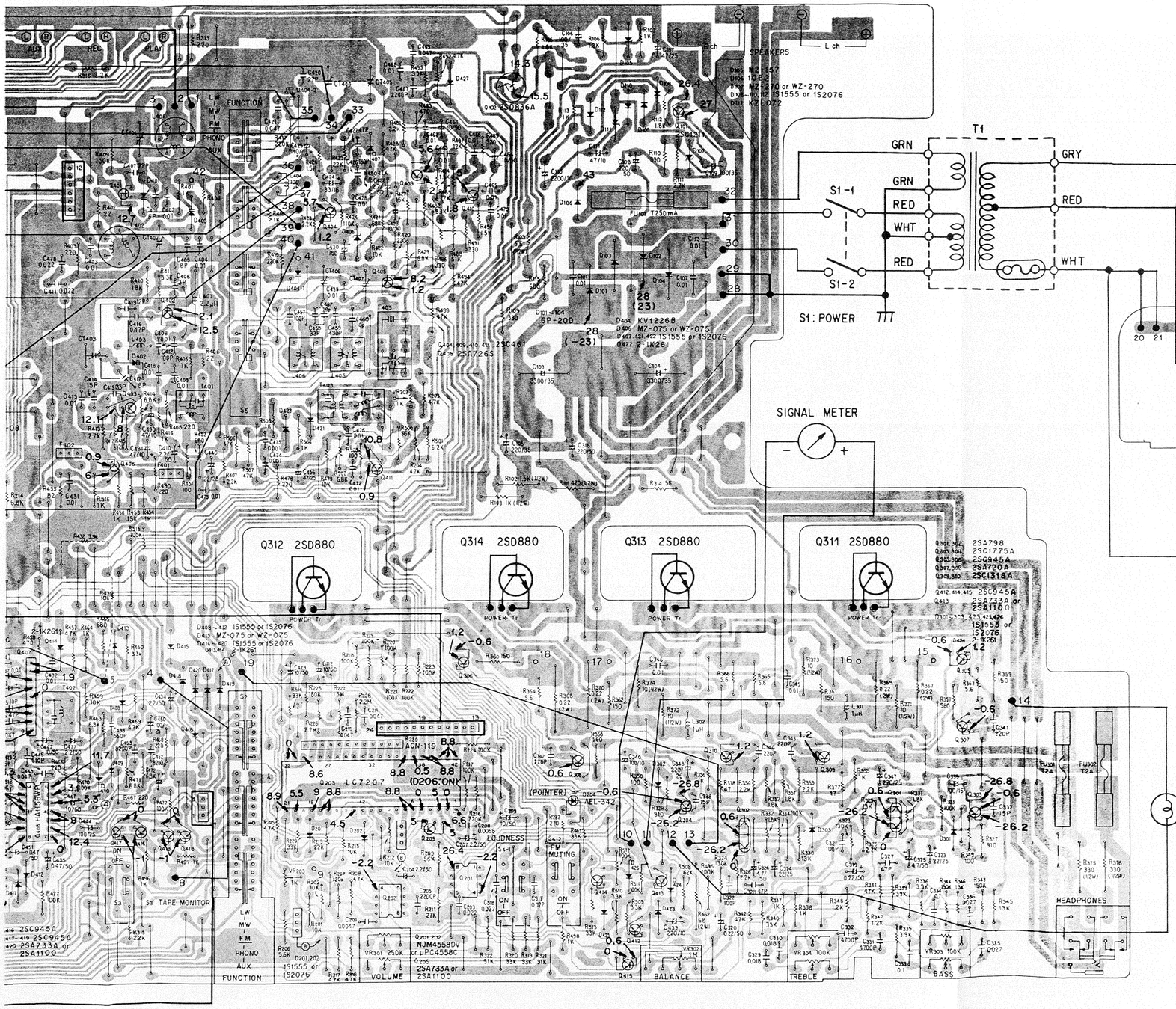


Fig. 7-2 Power Amplifier Adjustment

8. P.C. BOARDS CONNECTION DIAGRAM

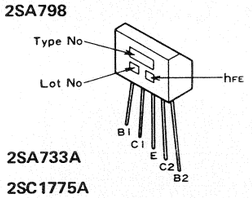


TUNER/AF AMP Ass'y GWM-164

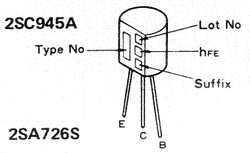


External Appearance of Transistors and ICs

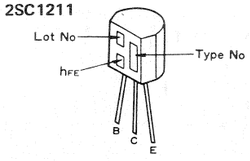
2SA798



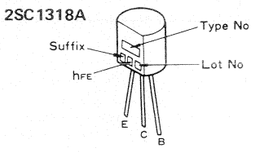
2SA733A
2SC1775A
2SC945A



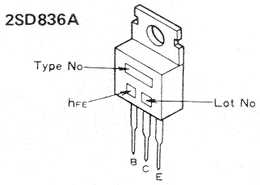
2SA726S
2SA1100
2SC1211



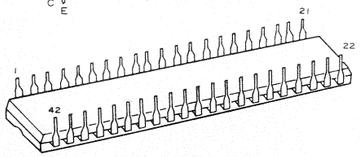
2SA720A
2SC1318A



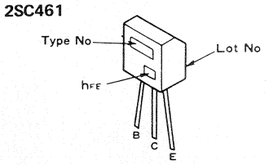
2SD880
2SD836A



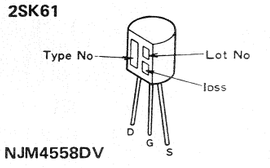
LC7207



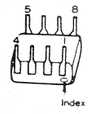
2SC535
2SC461



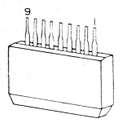
2SK61



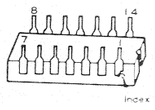
NJM4558DV
μPC4558C
NJM4558DX



TA7303P

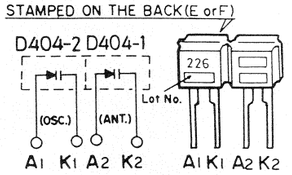


HA1156W

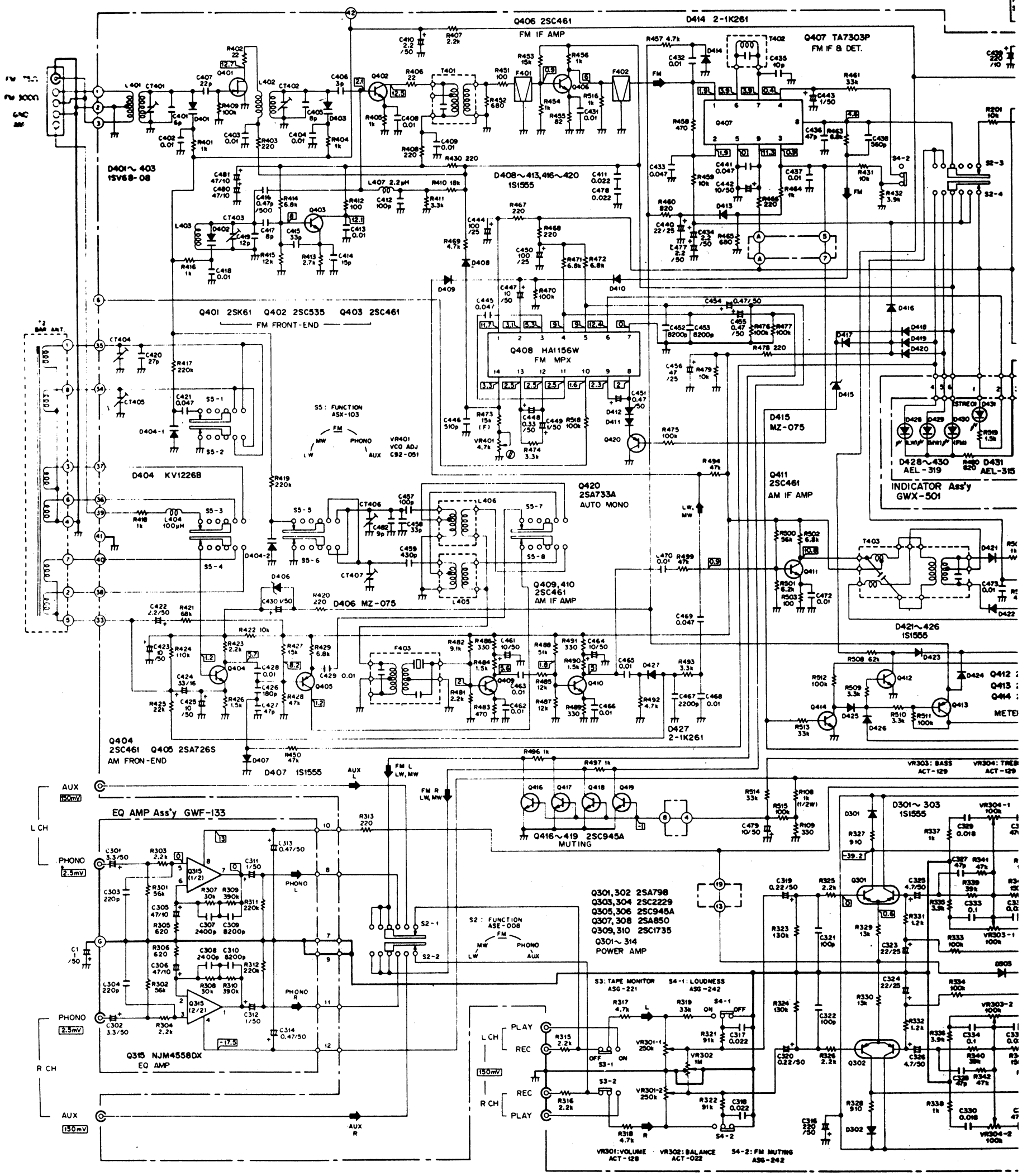


D404 (KV1226B) consists of two vari-cap diodes with the identical characteristics. When replacing either of them, first split the new D404 into two pieces (D404-1 and D404-2), and replace both of them by new D404-1 (for the AM antenna tuning circuit) and D404-2 (for AM local oscillator circuit) at the same time in order to match their characteristics.

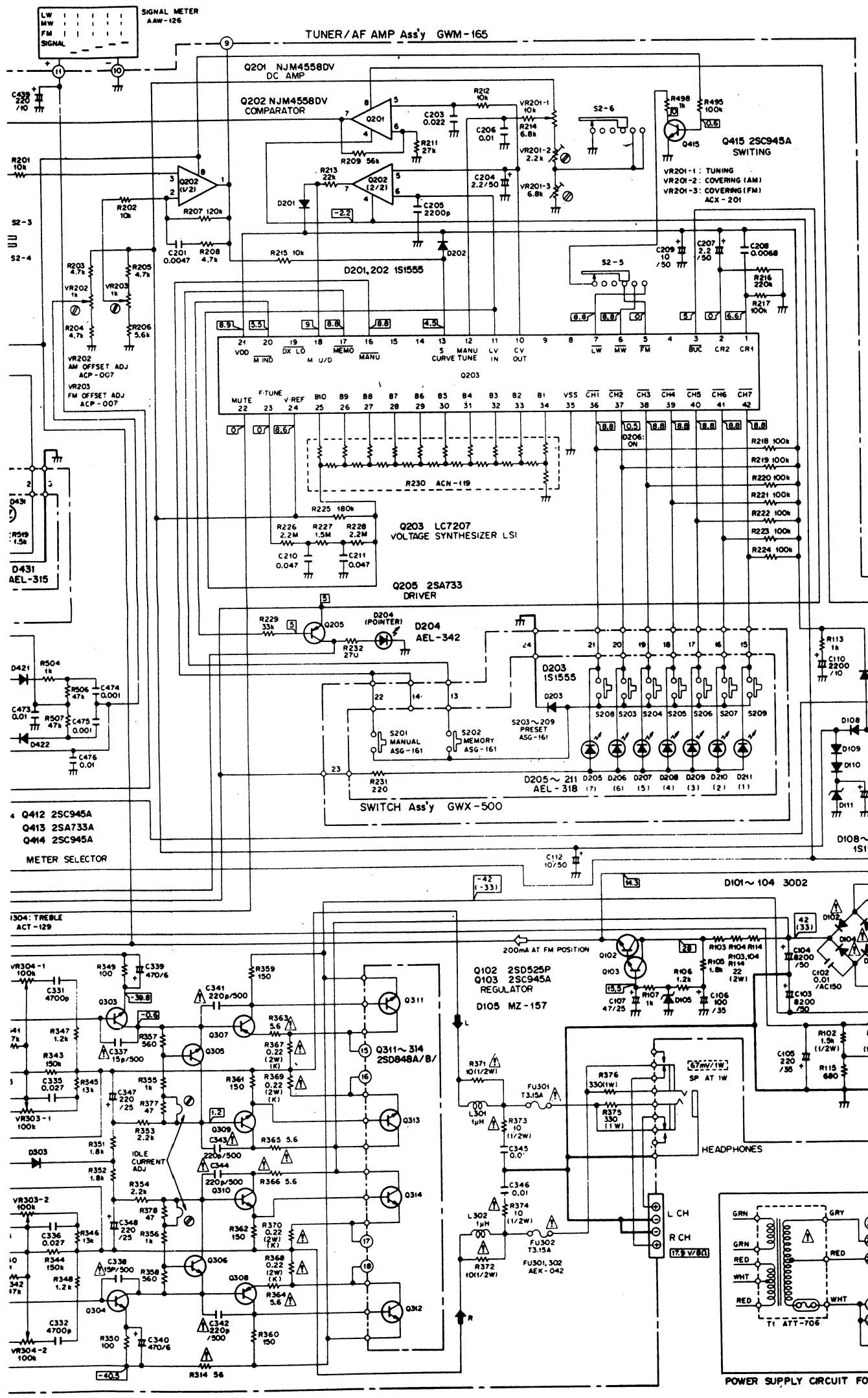
STAMPED ON THE BACK(E or F)



9. SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k : kΩ, M : MΩ, (F) : ±1%, (G) : ±2%, (K) : ±10%tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p : pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
Signal voltage at 40 W + 40 W 8Ω output (1kHz)
DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦ mA DC current at no input signal

4. OTHERS:
➡ : Signal route.
⊘ : Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

SWITCHES:

S1 : POWER	ON – STAND-BY
S2,5: FUNCTION	LW – MW – FM – PHONO – AUX
S3: TAPE MONITOR	ON – OFF
S4-1 : LOUDNESS	ON – OFF
S4-2: FM MUTING	ON – OFF
S201 : MANUAL	ON – OFF
S202: MEMORY	ON – OFF
S203: PRESET	ON – OFF
S204: PRESET	ON – OFF
S205: PRESET	ON – OFF
S206: PRESET	ON – OFF
S207: PRESET	ON – OFF
S208: PRESET	ON – OFF
S209: PRESET	ON – OFF

The underlined indicates the switch position.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design

10. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RSIP 0 1 0 K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Miscellaneous Parts

FUSES

Part No.	Symbol & Description	
⚠ AEK-405	FU1	Fuse T1.6A 250V
⚠ AEK-404	FU2	Fuse T2.5A 250V
⚠ AEK-037	FU101	Fuse T250mA 250V
⚠ AEK-042	FU301, FU302	Fuse T3.15A 250V

SEMICONDUCTORS

Part No.	Symbol & Description
2SD848A/B/-R* or 2SD848A/B/-Q*	Q311-Q314

*hfe of Q311 – Q314 should have the same value.

P.C. BOARD ASSEMBLIES

Part No.	Description
GWM-165	Tuner/AF assembly
GWF-133	EQ AMP assembly
GWX-500	Switch assembly
GWX-501	Indicator assembly
GWX-502	Fuse assembly

OTHERS

Part No.	Symbol & Description	
⚠ ATT-706	T1	Power transformer
ATX-019	T2	Bar-antenna
⚠ ASK-522	S1	Lever switch (POWER)
AEL-140	PL1	Lamp with wires
⚠ AKP-026		AC socket
⚠ ADG-041		AC power cord
AKA-007		Terminal (ANTENNA)
AAW-126		Signal meter
CEA 010M 50L	C1	

Tuner/AF assembly (GWM-165)

Part No.	Symbol & Description	
ATC-112	L401	FM ANT coil
ATC-121	L402	FM RF coil
ATC-115	L403	FM OSC coil
ATB-071	L405	AM OSC coil
ATD-008	L406	LW OSC coil
T24-028	L407	RF choke coil
ATE-039	T401	FM IFT
ATE-051	T402	FM DET
ATB-070	T403	Ratio DET
ATF-053	F401, F402	FM ceramic filter
ATF-087	F403	AM ceramic filter

SWITCHES

Part No.	Symbol & Description	
ASE-008	S2	Slide rotary (FUNCTION)
ASX-103	S5	Remote slide (FUNCTION-AM BAND)
ASG-221	S3	Push (TAPE MONITOR)
ASG-242	S4	Push (FM MUTING, LOUDNESS)

CAPACITORS

Part No.	Symbol & Description	
ACM-008	CT401, CT402, CT404, CT406, CT407	Film trimmer
ACM-006	CT403	Ceramic trimmer
ACM-009	CT405	Film trimmer
ACG-004	C101, C102, C113	Ceramic 0.01/150V
ACH-215	C103, C104	Electrolytic 200/50V
CEA 222M 10L	C110	
CEA 221M 50L	C108, C316	
CEA 101M 35L	C106, C109	

Part No.	Symbol & Description
CEA 221M 35L	C105
CEA 470M 25L	C107, C456
CEA 470M 10L	C111, C480, C481
CEA 100M 50L	C112, C209, C423, C425, C442, C447, C461, C464, C479
CKDYF 472Z 50	C201
CEA 2R2M 50L	C204, C207, C410, C422, C434, C477
CKDYB 222K 50	C205, C467
CKDYB 682K 50	C208
CKDYF 473Z 50	C210, C211, C421, C433, C441, C445, C469
CKDYF 223Z 50	C203, C207, C317, C318, C411, C478
CKDYF 103Z 50	C206, C345, C346, C402, C403, C404, C408, C409, C413, C418, C428, C429, C431, C432, C437, C462, C463, C465, C466, C468, C470, C472, C473, C476
CEANL 4R7M 50	C325, C326, C451
CEANL R22M 50	C319, C320
CEA 221M 25L	C347, C348
CEA 471M 6L	C339, C340
CEA 220M 25L	C323, C324, C440
CCDSL 101J 50	C321, C322, C412
⚠ CCDSL 150K 500	C337, C338
CCDSL 470J 50	C327, C328, C427, C436
⚠ CCDSL 221K 500	C341 – C344
CKDYB 472K 50	C331, C332
CQMA 104K 50	C333, C334
CQMA 273K 50	C335, C336
CQMA 183K 50	C329, C330
CCDRH 060D 50	C401
CCDRH 080D 50	C405, C417
CCDCH 030D 50	C406
CCDSL 220J 50	C407
CCDCH 150J 50	C414
CCDCH 330J 50	C415
CCDSL 100D 50	C435
CCDSH 270J 50	C420
CKDYB 561K 50	C438
CCDPH 120J 50	C419
CKDYB 102K 50	C474, C475
CKDYB 822K 50	C452, C453
CCDSL 181J50	C426
CCDUJ 090D50	C482
CCDUJ 330J 50	C458
CQSH 431J 50	C459
CQSH 101J 50	C457
CQSH 511J 50	C446
CGB R47K 500	C416
CEA 101M 25L	C444, C450
CEA 330M 16L	C424
CEA 221M 10L	C439
CEA 010M 50L	C430, C443
CEA R47M 50L	C454, C455
CCDTH 080D 50	C460
CEANL 010M 50	C449
CEANL R33M 50	C448

RESISTORS

Part No.	Symbol & Description
ACX-201	VR201 Tuning resistor
ACP-007	VR202, VR203 Semi-fixed 1k-B
ACT-128	VR301 Variable (VOLUME)
ACT-022	VR302 Variable (BALANCE)
ACT-129	VR303, VR304 Variable (BASS, TREBLE)
C92-051	VR401 Semi-fixed 4.7k-B
ACN-119	R230 Resistor network (Ladder)
⚠ ACN-065	R367 – R370 Fusing resistor 0.22/2W
⚠ RD1/2PSF □□□J	R101, R371 – R374
⚠ RD1/4PMF □□□J	R314, R363 – R366
RD1/2PS □□□J	R102, R108, R359 – R362
RD1/4PM □□□J	R105 – R107, R109 – R113, R115, R201 – R209, R211 – R229, R232, R313, R315 – R358, R377 R378, R401 – R432, R450 – R461, R463 – R466, R468 – R472, R474 – R479, R481 – R496, R498 – R516, R518
RS1P □□□J	R375, R376
RS2P □□□J	R103, R104, R114, R462
RN1/4PQ □□□□F	R473
RD1/4VM □□□J	R467, R497

SEMICONDUCTORS

Part No.	Symbol & Description
2SC1211	Q101
2SD525P	Q102
2SC945A	Q103, Q305, Q306, Q412, Q414 – Q419
NJM4558DV (μPC4558C)	Q201, Q202
LC7207	Q203
2SA733A (2SA1100)	Q205, Q413, Q420
2SA798	Q301, Q302
2SC2229 (2SC1885)	Q303, Q304
2SC1735-D* or 2SC1735-C*	Q309, Q310
2SA850-D* or 2SA850-C*	Q307, Q308

*hfe of Q307 – Q310 should have the same value.

2SK61-Y	Q401
2SC535	Q402
2SC461	Q403, Q404, Q406, Q409 – Q411
2SA726S	Q405
TA7303P-C	Q407
HA1156W-P	Q408
⚠ 30D2	D101 – D104
⚠ 10E2 (SIB01-02)	D106
1S1555 (1S2076)	D108 – D110, D112, D201, D202, D301 – D303, D407 – D412, D416 – D423, D425, D426

Part No.	Symbol & Description	
MZ-270 (WZ-270)	D107	
MZ-157	D105	
KZL072	D111	
AEL-342	D204	LED (orange)
1SV68-08	D401 – D403	
KV1226B**	D404 (Twin package)	

***D404 (KV1226B) consists of two vari-cap diodes with the identical characteristics. When replacing either of them, first split the new D404 into two pieces (D404-1 and D404-2), and replace both of them by new D404-1 (for the AM antenna tuning circuit) and D404-2 (for AM local oscillator circuit) at the same time in order to match their characteristics.*

2-1K261	D413, D414, D424, D427	
MZ-075 (WZ-075)	D406, D415	

OTHERS

Part No.	Symbol & Description
AKB-064	Terminal (AUX, TAPE)
AKE-048	Terminal (SPEAKERS)
AKN-029	Phone jack (PHONES)
VBZ30P060FMC	Screw
PMZ25P040FMC	Screw

EQ AMP Assembly (GWF-133)

CAPACITORS

Part No.	Symbol & Description
CEANL 3R3M 50	C301, C302
CEA 470M 10L	C305, C306
CEA 010M 50L	C311, C312
CEA R47M 50L	C313, C314
CCDSL 221J 50	C303, C304
CKDYA 822J 50	C309, C310
CQMA 242J 50	C307, C308

RESISTORS

Part No.	Symbol & Description
RD1/4PM □□□J	R301 – R312

SEMICONDUCTOR

Part No.	Symbol & Description
NJM4558DX	Q315

OTHER

Part No.	Symbol & Description
AKB-062	Terminal (PHONO)

Switch Assembly (GWX-500)

Part No.	Symbol & Description	
ASG-161	S201 – S209	Tact switch
RD1/4PM 221J	R231	
AEL-318	D205 – D211	LED (Green)
1S1555 (1S2076)	D203	

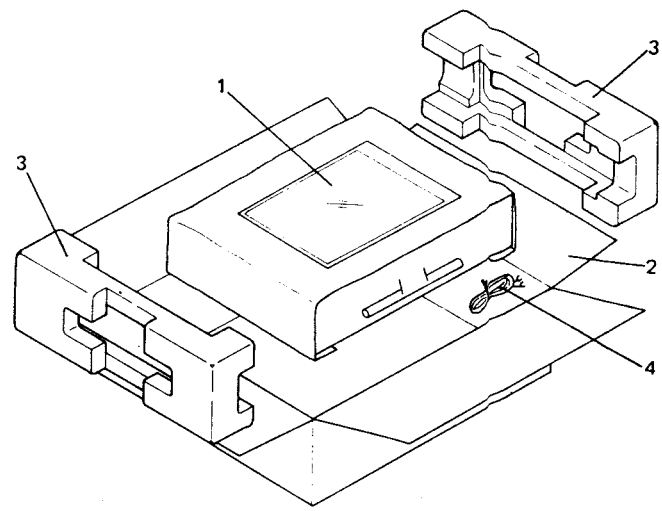
Indicator Assembly (GWX-501)

Part No.	Symbol & Description	
AEL-319	D428 – D430	LED (Orange)
AEL-315	D431	LED (Red)
RD1/4PM □□□J	R480, R519	

Fuse Assembly (GWX-502)

Part No.	Symbol & Description	
ACG-001	C1	Ceramic capacitor 0.01/250V

11. PACKING

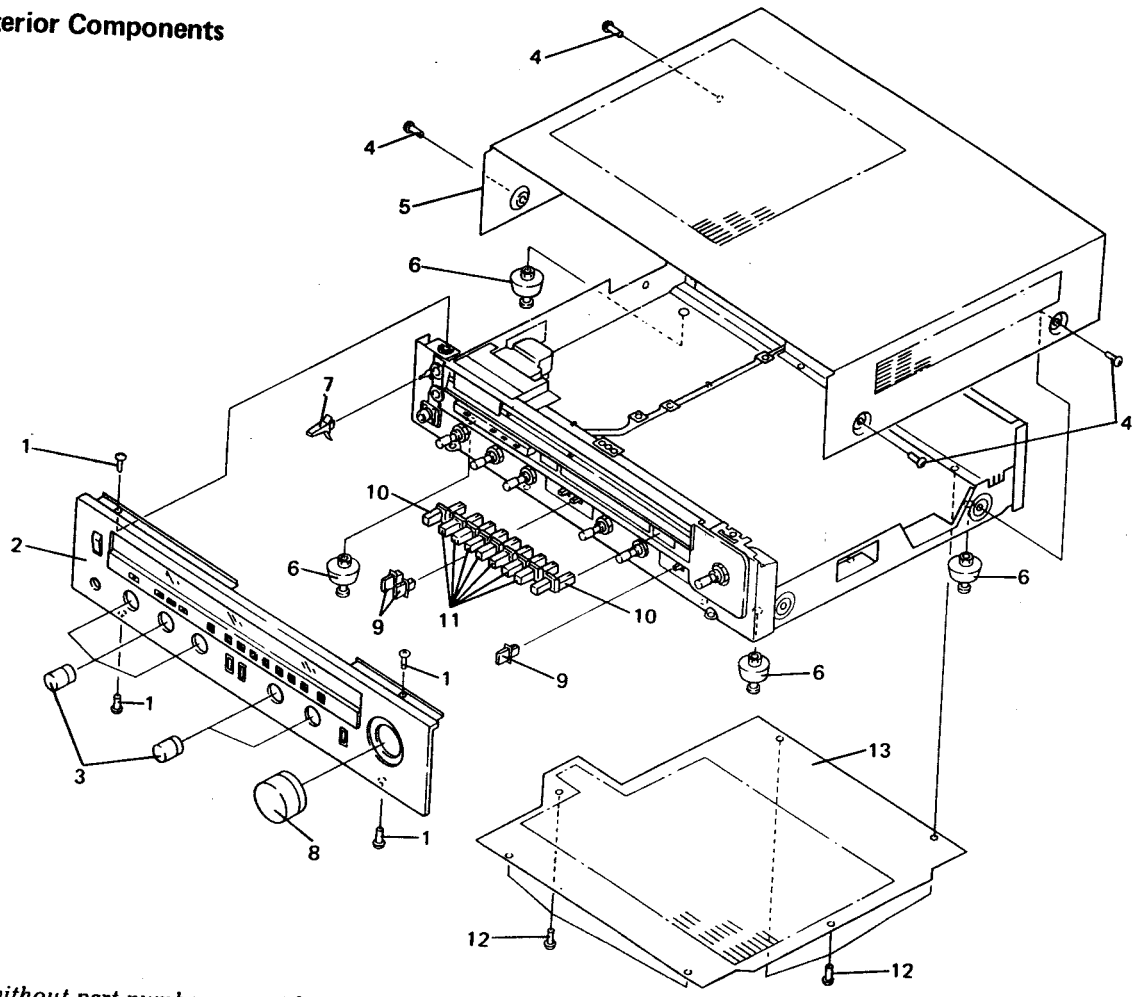


Parts List

Key No.	Part No.	Description
1.	ARB-369	Operating instructions (English)
	ARD-149	Operating instructions (German/French)
2.	AHD-780	Packing case
3.	AHA-254	Side pad
4.	ADH-004	T-type FM antenna

12. EXPLODED VIEW

Exterior Components

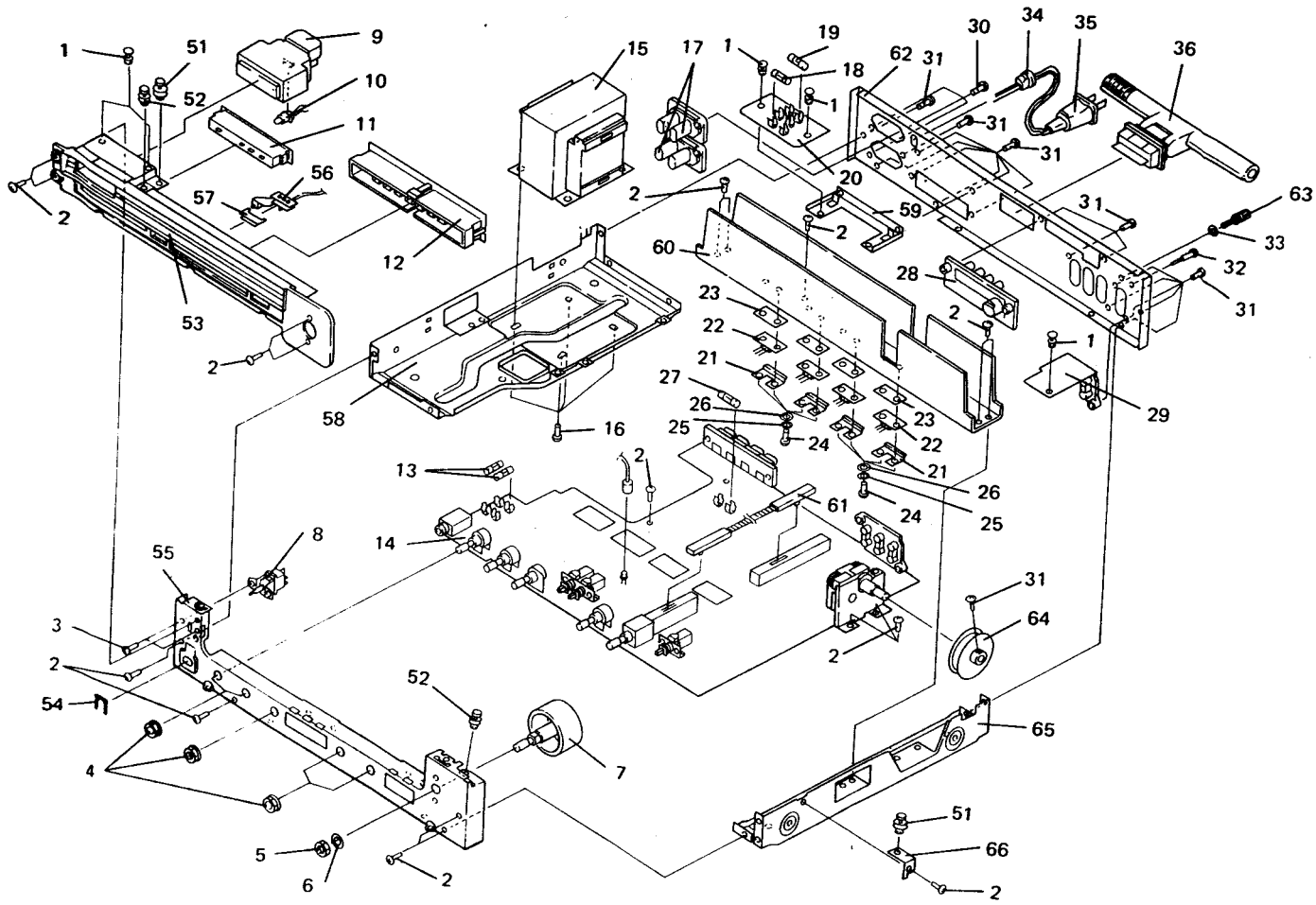


NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*

Key No.	Part No.	Description
1.	BCZ30P080FMC	Screw
2.	ANB-900	Front panel assembly
3.	AAB-244	Knob (BASS, TREBLE, BALANCE, VOLUME, FUNCTION)
4.	FBT40P080FZK	Screw
5.	ANE-269	Bonnet case
6.	AEC-672	Foot assembly
7.	AAD-200	Lever knob (POWER)
8.	AAA-069	Knob (TUNING)
9.	AAD-179	Push knob (FM MUTING, LOUDNESS, TAPE MONITOR)
10.	AAD-299	Push knob (MEMORY, MANUAL)
11.	AAD-298	Push knob (Preset 1 – 7)
12.	VBZ30P060FMC	Screw
13.		Bottom plate

Interior Components



Key No.	Part No.	Description
1.	AEC-384	Nylon rivet
2.	VBZ30P060FMC	Screw
3.	PMZ30P060FMC	Screw
4.	ABN-024	Washrfaced nut
5.	NK90FUC	Nut M9
6.	WA92F140U100	Flat washer
7.	AXA-274	Tuning shaft assembly
⚠ 8.	ASK-522	Lever switch (POWER)
9.	AAW-126	Signal meter
10.	AEL-140	Lamp with wires (8V 100mA)
11.	GWX-501	Indicator assembly
12.	GWX-500	Switch assembly
⚠ 13.	AEK-042	Fuse (T3.15A 250V)
14.	GWM-165	Tuner/AF assembly
⚠ 15.	ATT-706	Power transformer
16.	VXZ40P080FMC	Screw
⚠ 17.	AKP-026	AC socket (AC OUTLETS)
⚠ 18.	AEK-405	Fuse (T1.6A 250V)
⚠ 19.	AEK-403	Fuse (T2.5A 250V)
20.	GWX-502	Fuse assembly

Key No.	Part No.	Description
21.	AKH-008	Transistor holder
22.	2SD848A/B/	Transistor
23.	AEC-288	Mica wafer
24.	ABA-187	Screw
25.	WS35F065M100	Spring washer
26.	WB30FNi	Flat washer
⚠ 27.	AEK-037	Fuse (T250mA 250V)
28.	AKA-007	Terminal (ANTENNA)
29.	GWF-133	EQ AMP assembly
30.	MTZ30P100FZK	Screw
31.	BBT30P080FZK	Screw
32.	ABA-176	Screw
33.	WA35F100N080	Flat washer
34.	AEC-327	Strain relief
⚠ 35.	ADG-041	AC power cord
36.	ATX-019	Bar-antenna

(Continued on the next page below)

13. SUPPLEMENTS FOR HB TYPE

Model SX-700L/HB is the same as the SX-700L/HE with exception of descriptions in this supplement.

CONTRAST OF MISCELLANEOUS PARTS

Symbol	Description	Part No.		Remarks
		HE type	HB type	
⚠ FU2	Fuse T2.5A 250V	AEK-403	.....	
⚠	AC socket	AKP-026	.....	
⚠	AC power cord	ADG-041	ADG-051	
	Screw	MTZ30P100FZK	.....	for AC socket
	Operating instructions (German/French)	ARD-149	.....	

(Continued from the preceding page)

Key No.	Part No.	Description
51.		Pulley assembly
52.		Pulley assembly (small)
53.		Dial panel
54.		Lock plate
55.		Front stay
56.		Dial pointer assembly
57.		Smoother
58.		Frame
59.		P.C. Board holder
60.		Heat sink
61.		Remote wire
62.		Rear panel
63.		Terminal (GND)
64.		Tuning drum assembly
65.		Frame R
66.		Pulley holder